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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/824,183	04/12/2004	Zoran Minevski	LYNN/0172	5898

24945 7590 08/24/2006

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EXAMINER

LEADER, WILLIAM T

ART UNIT PAPER NUMBER

1742

DATE MAILED: 08/24/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/824,183	MINEVSKI ET AL.	
	Examiner	Art Unit	
	William T. Leader	1742	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-97 is/are pending in the application.
- 4a) Of the above claim(s) 13,54 and 71-93 is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-12,14-43,50-53,55-70 and 94-97 is/are rejected.
- 7) ☒ Claim(s) 44-49 is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. ____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____. |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>6/04, 9/04, 10/04</u> . | 6) <input type="checkbox"/> Other: ____. |

DETAILED ACTION

1. Receipt of the papers filed on June 13, 2006, is acknowledged. Applicant has identified claims 1-12, 14-53, 55-70 and 94-97 as readable on the elected species.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

4. Claims 1-6, 9-12, 14, 29-32, 37, 53 and 94-97 are rejected under 35 U.S.C. 103(a) as being unpatentable over the admitted prior art, Sordelet et al (6,242,108) or Darolia et al (6,749,951) in view of Thoma et al (4,895,625) and Foster et al (4,789,441).

5. The admitted prior art is that found in the specification under the heading "Background of the Related Art" and show that it is known to form coatings comprising quasicrystals. The

coating exhibit abrasion resistant and non-stick properties. The coatings may be formed by thermal spraying techniques. The admitted prior art shows that a number of quasicrystal compositions such as $\text{Al}_{64}\text{Cu}_{24}\text{Fe}_{12}$ and $\text{Al}_{66}\text{Cu}_{18}\text{Fe}_8\text{Cr}_8$ are known.

6. The Sordelet et al patent is directed to a method of making abrasion resistant coatings. The coatings include a quasicrystalline brittle phase and an intermetallic ductile phase. The coating may be formed by plasma spraying. See the abstract. The quasicrystalline alloy may, for example, have a nominal composition of $\text{Al}_{65}\text{Cu}_{23}\text{Fe}_{12}$. See column 2, line 10)

7. The Darolia et al patent is directed to a coating with high wear resistance. The coating includes a layer with a mixture of a quasicrystalline metallic phase and a non-quasicrystalline ductile phase. See the abstract. The quasicrystalline metallic phase may be any operable material (column 2, lines 38-48). Examples include $\text{Al}_{62.5}\text{Cu}_{25}\text{Fe}_{12}$ and $\text{Al}_{71}\text{Co}_{13}\text{Fe}_8\text{Cr}_8$ (column 4, lines 63-67). The coating may be applied by a physical vapor deposition technique such as plasma spraying (column 6, lines 50-59).

8. The process of claim 1 differs from that of the prior art by reciting that the quasicrystalline metal alloy is deposited by electrodeposition from an electroplating bath comprising particles of the quasicrystalline material. The Thoma et al patent is directed to a method for producing a protective coating. Thoma et al recognize that protective coatings have been applied by thermal spraying and physical vapor deposition techniques but these methods are disadvantageous because of their high cost (column 1, lines 38-44). Thoma et al disclose a method in which a protective coating is formed by electrodeposition from a bath containing alloy

particles and an elemental metal such as nickel (column 2, lines 44-62). The cost of the electrodeposition method is only about 10% of the conventional cost (column 3, line 2-4).

9. The Foster et al patent is directed to the formation of metallic protective coatings. Foster discloses that it is known to form the coatings by plasma spraying or electron beam evaporation but that these processes are expensive (column 1, lines 33-37). Foster teaches the use of electrodeposition from a bath containing an elemental metal such as Ni, Co or Fe, and alloy particles (column 1, lines 52-59). The coatings have desirable very desirable properties and surface finish (column 1, lines 65-68).

10. The prior art of record is indicative of the level of skill of one of ordinary skill in the art. It would have been obvious to have formed a quasicrystalline containing coating by electrodeposition from a bath containing quasicrystalline particles and an elemental metal as taught by Thoma et al and Foster et al in place of conventional methods such as plasma spraying as taught by the admitted prior art, Sordelet et al and Darolia et al because the electrodeposition process is more economical and is known to produce a coating with desirable properties.

11. With respect to claims 2 and 3, in order for electrodeposition on a surface to occur, an electrically conductive surface is necessary; the workpieces which form the working electrodes of Thoma et al and Foster et al are metal alloys. With respect to claims 4-6, as noted above, the elemental metal of Thoma et al and Foster et al may be nickel.

12. With respect to claims 9-12, 32 and 53 the admitted prior art, Sordelet et al and Darolia et al discloses that quasicrystal having the recited compositions are known. With respect to claim 14, Thoma et al disclose that the concentration of particles in the plating bath may be 100 g/l.

With respect to claims 29 and 30, Thoma et al (column 4, line 54) and Foster et al (claims 8-12) disclose the use of particles having a size less than 20 microns.

13. Claims 15-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over the admitted prior art, Sordelet et al (6,242,108) or Darolia et al (6,749,951) in view of Thoma et al (4,895,625) and Foster et al (4,789,441) as applied to claims --- above, and further in view of Luch.

14. Claim 17 recites the use of a polymer composite comprising carbon as the working electrode. The Luch patent is directed to forming a durable coating on a plastic workpiece. Luch discloses that platable plastics include a polymer - carbon composite (column 4, lines 43-46). It would have been obvious to have utilized a polymer - carbon composite as the working electrode in a process for depositing a quasicrystal-containing coating because such substrates are recognized by Luch as suitable for receiving a durable coating.

15. Claims 7, 8, 18-27, 33-36, 38-40, 50, 51, 55-57 and 68-70 are rejected under 35 U.S.C. 103(a) as being unpatentable over the admitted prior art, Sordelet et al (6,242,108) or Darolia et al (6,749,951) in view of Thoma et al (4,895,625) and Foster et al (4,789,441) as applied to claims 1-6, 9-12, 14, 29-32, 37, 53 and 94-97 above, and further in view of the Lowenheim text, *Electroplating*.

16. The Lowenheim text is directed to electroplating broadly. Pages 120-121 list the typical ingredients of a plating bath, which include a source of the metal to be deposited and pH control

agents. With respect to claims 7, 8, 20-27, 33-35, 55, 56 Lowenheim discloses the use of aqueous nickel plating baths at pages 211-219. In the bath of table 12-14, the temperature of the bath was 45-65°C. The bath utilized nickel sulfate as a nickel source and may contain a boric acid as a buffering agent. With respect to claims 38-41, in table 12-14 Lowenheim discloses that the current density may be 205-1000 A/m² (25-100 mA/cm²). With respect to claims 57, 68 and 69, Lowenheim discloses that copper sulfate is a suitable source of copper in copper plating baths (pages 194-202). With respect to claim 70, Lowenheim discloses vapor degreasing prior to electroplating to remove contaminants from the surface to be electroplated (page 74). It would have been obvious to have utilized a typical nickel plating bath or copper plating bath as disclosed by Lowenheim for depositing the coatings of Thoma et al and Foster et al because such baths are shown by Lowenheim to produce desirable deposits. Optimization of recognized plating parameters would have been obvious.

17. With respect to claims 18 and 19, Lowenheim teaches the use of a strike coating. In particular, in a process for electroplating an aluminum workpiece, the electroplating step may be preceded by the formation of a zincate coating and a strike copper deposit. See page 89-91. It would have been obvious to have provided a strike coating prior as shown by Lowenheim to the electroplated layer suggested by Thoma et al and Foster et al because the properties of the final coating would have been improved.

18. Claims 28, 41, 52, 58 and 67 are rejected under 35 U.S.C. 103(a) as being unpatentable over the admitted prior art, Sordelet et al (6,242,108) or Darolia et al (6,749,951) in view of

Thoma et al (4,895,625) and Foster et al (4,789,441) as applied to claims 1-6, 9-12, 14, 29-32, 37, 53 and 94-97 above, and further in view of Foster ('5833,829).

19. Foster '829 discloses a process for the coelectrodeposition of an elemental metal and particles. As shown in figure 2, the bath is agitated. As shown in figure 4, a plurality of moving workpieces are coated. Foster additionally discloses masking parts of the workpieces not to be plated (column 8, lines 1-4). It would have been obvious to have agitated the bath in the process of Thoma et al and Foster et al as shown by Foster '829 because the particles would have been dispersed.

20. Claims 42 and 43 are rejected under 35 U.S.C. 103(a) as being unpatentable over the admitted prior art, Sordelet et al (6,242,108) or Darolia et al (6,749,951) in view of Thoma et al (4,895,625) and Foster et al (4,789,441) as applied to claims 1-6, 9-12, 14, 29-32, 37, 53 and 94-97 above, and further in view of Oguto et al (5792,333).

21. The Oguto et al patent is directed to an electroplating process in which a seal layer is deposited from separate tank 4 over a previously electrodeposited layer. See figure 1. The seal layer prevents any shedding of the previously electrodeposited material (column 6, lines 21-27). It would have been obvious to have provided a seal layer to have sealed any porosity and to have prevented shedding of deposited material as taught by Oguto et al.

22. Claims 59-66 are rejected under 35 U.S.C. 103(a) as being unpatentable over the admitted prior art, Sordelet et al (6,242,108) or Darolia et al (6,749,951) in view of Thoma et al

(4,895,625) and Foster et al (4,789,441) as applied to claims 1-6, 9-12, 14, 29-32, 37, 53 and 94-97 above, and further in view of Biner et al (5,851,317).

23. Thoma et al discloses heat treating the deposit after it is formed. See example 1. Foster et al also discloses heating treating the deposit. See column 2, lines 59-68). The Biner et al patent is directed to a composite material reinforced with quasicrystalline particles. Biner discloses that the particles may be heat treated at a suitable high temperature to impart a single phase quasicrystal microstructure to the particles (column 4, lines 3-10). It would have been obvious at the time the invention was made to have heat treated quasicrystals prior to and after electrodeposition because the properties of the particles and the deposit would have been improved as taught by Thoma et al, Foster et al and Binder et al.

Allowable Subject Matter

24. Claims 44-49 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to William T. Leader whose telephone number is 571-272-1245. The examiner can normally be reached on Mondays-Thursdays and alternate Fridays, 7:30-4:00.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Roy King, can be reached on 571-272-1244. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.



William Leader
August 16, 2006



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